

=====

Sequence Listing was accepted.

If you need help call the Patent Electronic Business Center at (866)
217-9197 (toll free).

Reviewer: MSpencer

Timestamp: Thu Apr 26 13:51:51 EDT 2007

=====

Application No: 10584429

Version No: 4.0

Input Set: E:\2007\04\13\10584429\JAMES.TXT

Output Set: E:\2007\04\13\10584429\JAMES.pdf

Started: 2007-04-19 14:28:04.599

Finished: 2007-04-19 14:28:05.671

Elapsed: 0 hr(s) 0 min(s) 1 sec(s) 72 ms

Total Warnings: 0

Total Errors: 0

No. of SeqIDs Defined: 55

Actual SeqID Count: 55

ErrCode	Error Description
---------	-------------------

SEQUENCE LISTING

<110> Bryan, Gregory Thomas
Johnson, Richard
Scott, Barry
Young, Carolyn A.
Tapper, Brian Anthony
Parker, Emily Jane

<120> INDOLE-DITERPENE BIOSYNTHESIS

<130> JAMES68.016APC

<140> 10584429

<141> 2007-05-07

<150> US 10/584,429

<151> 2006-06-22

<150> PCT/NZ2004/000333

<151> 2004-12-22

<150> NZ 530331

<151> 2003-12-22

<160> 55

<170> PatentIn version 3.3

<210> 1

<211> 1110

<212> DNA

<213> Neotyphodium lolii

<400> 1

atgacgatgg ctgccaatga ctttccattt caatgccagg agaagaaatc atattctcag	60
ccaagtctag tctactgcaa tggtaacatt gcggagacgt atctcgaaga aaaggtattt	120
atactgctcc ttataaatct cgaatgccac ttaaaattta gacaggtttt gacagcgccg	180
ttggattatt tgcgtgcctt acctagcaaa gatattcgca gtggactgac cgacgccatt	240
aatgagttcc tgcgtgtccc agaggaaaag gttcttgtca taaagcgtat aattgatctt	300
cttcacaatg catccttact gtaagttcga gattgcataa catagaccta gtagattcta	360
actaacagct ttagcattga tgatatccag gattcatcca aactgcgacg tggagtcctt	420
gtagcccacc acatatttgg aatcgcacaa acaataaatt cggccaatct agcgtatttc	480
attgcccaga gagagcttga gaagcttacg aatcctcgag catttgctat atataatgag	540
gagctaata atctgcatcg tggtcagggt atggagctcc attggagaga atcgctccat	600
tgcctaccg aagatgagta tctgcgaatg atccaaaaga agacaggcgg tctgttccga	660

ttggcaatca gactgctgca aggcgaaagc gctagcgatg acgattatgt ctcacttatt 720
 gatactctcg gaacctgtt ccagattcga gatgactatc aaaacttaca gagtgatata 780
 tattctaaga acaaaggcta ctgtgaggat ttaacagagg gcaaattctc gtatccggtc 840
 atccatagta ttcggtcgcg accaggagat gttcgattaa tcaatatattt gaaacagcgt 900
 agtgaagatg ttatggtgaa gcaatacgcg gtgcaacata tcgaatctac aggaagcttc 960
 gcattctgtc aaaataaaat tcaatctttg gtggagcaag caagagagca attggcggct 1020
 ctagaaaata gcagttcatg tggaggcccc gttcgcgaca tccttgacaa gttagcaata 1080
 aaaccacggg caaatataga agtagagtag 1110

<210> 2
 <211> 334
 <212> PRT
 <213> Neotyphodium lolii

 <400> 2

Met Thr Met Ala Ala Asn Asp Phe Pro Phe Gln Cys Gln Glu Lys Lys
 1 5 10 15

Ser Tyr Ser Gln Pro Ser Leu Val Tyr Cys Asn Gly Asn Ile Ala Glu
 20 25 30

Thr Tyr Leu Glu Glu Lys Val Leu Thr Ala Pro Leu Asp Tyr Leu Arg
 35 40 45

Ala Leu Pro Ser Lys Asp Ile Arg Ser Gly Leu Thr Asp Ala Ile Asn
 50 55 60

Glu Phe Leu Arg Val Pro Glu Glu Lys Val Leu Val Ile Lys Arg Ile
 65 70 75 80

Ile Asp Leu Leu His Asn Ala Ser Leu Leu Ile Asp Asp Ile Gln Asp
 85 90 95

Ser Ser Lys Leu Arg Arg Gly Val Pro Val Ala His His Ile Phe Gly
 100 105 110

Ile Ala Gln Thr Ile Asn Ser Ala Asn Leu Ala Tyr Phe Ile Ala Gln
 115 120 125

Arg Glu Leu Glu Lys Leu Thr Asn Pro Arg Ala Phe Ala Ile Tyr Asn
130 135 140

Glu Glu Leu Ile Asn Leu His Arg Gly Gln Gly Met Glu Leu His Trp
145 150 155 160

Arg Glu Ser Leu His Cys Pro Thr Glu Asp Glu Tyr Leu Arg Met Ile
165 170 175

Gln Lys Lys Thr Gly Gly Leu Phe Arg Leu Ala Ile Arg Leu Leu Gln
180 185 190

Gly Glu Ser Ala Ser Asp Asp Asp Tyr Val Ser Leu Ile Asp Thr Leu
195 200 205

Gly Thr Leu Phe Gln Ile Arg Asp Asp Tyr Gln Asn Leu Gln Ser Asp
210 215 220

Ile Tyr Ser Lys Asn Lys Gly Tyr Cys Glu Asp Leu Thr Glu Gly Lys
225 230 235 240

Phe Ser Tyr Pro Val Ile His Ser Ile Arg Ser Arg Pro Gly Asp Val
245 250 255

Arg Leu Ile Asn Ile Leu Lys Gln Arg Ser Glu Asp Val Met Val Lys
260 265 270

Gln Tyr Ala Val Gln His Ile Glu Ser Thr Gly Ser Phe Ala Phe Cys
275 280 285

Gln Asn Lys Ile Gln Ser Leu Val Glu Gln Ala Arg Glu Gln Leu Ala
290 295 300

Ala Leu Glu Asn Ser Ser Ser Cys Gly Gly Pro Val Arg Asp Ile Leu
305 310 315 320

Asp Lys Leu Ala Ile Lys Pro Arg Ala Asn Ile Glu Val Glu
325 330

<210> 3

<211> 1647

<212> DNA

<213> Neotyphodium lolii

<400> 3

atgactagcg acttcaaggt aataatcgtg ggaggatcag tggctgggct ttcactagcc	60
cactgcttag aaaaaatcgg tgtttctttc atggttctag agaagggtaa tcaaatagct	120
ccccaaactcg gtgcctcaat tggcattttg ccaaagtgtg gacgtattct tgatcaactg	180
ggcatcttcc atagcatcga ggatgaaatc gaacctctag aatctgctat gatgagatac	240
ccggatgggtt tctctttcaa aagtcaatat cccaagctt tgcatactag gtaataacag	300
tgaaagaaga gtggcctata agtgttcata tatcgctaac ttcgtgcggt taatagtttt	360
ggttatcccg tggcttttct tgagaggcaa aggtttcttc agatacttta tgataaactc	420
aagagcaaag actgcgtttt tacaacaag cgggtagtca gtattgcaag tggccaagac	480
aaagtacacag caaagacttc agatggcgct aagtacttag cagatatcgt gatcggtgct	540
gacgggggtcc acagcatcgt caggtcagag atttgagggc atttgaagga aaactctcaa	600
atatcagtat tagaggcacc gaacgcaagt aggttaacct aggattaatt gcaaagaaac	660
tttactaatg agggagccac ttaggtatta agcatgatta ttcatgcatt tacggaatth	720
ctttaaacgt tccccagatc atcctaggaa tacagttaaa ctgtttagat gacggagtgt	780
caatacactt gtttacgggt aaacaatcca aattatthtg gtttgttatc atcaaacgc	840
ctcaggctag ctttgctaaa gtagagattg acaatacaca tacagcaagg tgtatctgcg	900
aaggactgag gacgaaaaag gtttcagata ccttatgtht tgaagatgta tggatcaagat	960
gcaccatatt caagatgacg cctcttgagg aagggtgtt taagcattgg aactatggcc	1020
gcttagcatg tattggtgat gctatccgca aggtatgtgg atgatgctat atgtccctat	1080
ttcgtgtcat cagtgggatg acaaaagaag gccactatth gccgctaata taaatgatcg	1140
tatcgctaac attaacagat ggccccaaat aatgggcaag gagcaaatat ggcgatagag	1200
gacgcttgca gtctcgcaaa catcctccag aaaaagatat cacatggttc gattcgagac	1260
caagatatca attcaatgtt tcaggaattc tctatggctc aacgggctcg cacggagagc	1320
gtctgcgcgc agtcggagtth tctagtcgcg atgcatgcga atcaaggat tggagaaga	1380
cttcttgggc ggtaccttat tcttttctg tatgacgcac ctgctggtht atctggatth	1440
tctataagtg gcgcaacaag aatagagthc atagacttgc ccactagatc tcttagggga	1500
gcgtggggaa agtcatggag agggatcatg gaattcatcc taaaaagctt ggtctatthg	1560
cgaccaagt ttaggatagt ttatgccttg tatctcgttg cagctgcagc tthtatcttg	1620
tattgtctta gcagtctctt cccgtag	1647

<210> 4
<211> 472
<212> PRT
<213> Neotyphodium lolii

<400> 4

Met Thr Ser Asp Phe Lys Val Ile Ile Val Gly Gly Ser Val Ala Gly
1 5 10 15

Leu Ser Leu Ala His Cys Leu Glu Lys Ile Gly Val Ser Phe Met Val
20 25 30

Leu Glu Lys Gly Asn Gln Ile Ala Pro Gln Leu Gly Ala Ser Ile Gly
35 40 45

Ile Leu Pro Asn Gly Gly Arg Ile Leu Asp Gln Leu Gly Ile Phe His
50 55 60

Ser Ile Glu Asp Glu Ile Glu Pro Leu Glu Ser Ala Met Met Arg Tyr
65 70 75 80

Pro Asp Gly Phe Ser Phe Lys Ser Gln Tyr Pro Gln Ala Leu His Thr
85 90 95

Ser Phe Gly Tyr Pro Val Ala Phe Leu Glu Arg Gln Arg Phe Leu Gln
100 105 110

Ile Leu Tyr Asp Lys Leu Lys Ser Lys Asp Cys Val Phe Thr Asn Lys
115 120 125

Arg Val Val Ser Ile Ala Ser Gly Gln Asp Lys Val Thr Ala Lys Thr
130 135 140

Ser Asp Gly Ala Lys Tyr Leu Ala Asp Ile Val Ile Gly Ala Asp Gly
145 150 155 160

Val His Ser Ile Val Arg Ser Glu Ile Trp Arg His Leu Lys Glu Asn
165 170 175

Ser Gln Ile Ser Val Leu Glu Ala Pro Asn Ala Ser Ile Lys His Asp
180 185 190

Tyr Ser Cys Ile Tyr Gly Ile Ser Leu Asn Val Pro Gln Ile Ile Leu

195

200

205

Gly Ile Gln Leu Asn Cys Leu Asp Asp Gly Val Ser Ile His Leu Phe
 210 215 220

Thr Gly Lys Gln Ser Lys Leu Phe Trp Phe Val Ile Ile Lys Thr Pro
 225 230 235 240

Gln Ala Ser Phe Ala Lys Val Glu Ile Asp Asn Thr His Thr Ala Arg
 245 250 255

Cys Ile Cys Glu Gly Leu Arg Thr Lys Lys Val Ser Asp Thr Leu Cys
 260 265 270

Phe Glu Asp Val Trp Ser Arg Cys Thr Ile Phe Lys Met Thr Pro Leu
 275 280 285

Glu Glu Gly Val Phe Lys His Trp Asn Tyr Gly Arg Leu Ala Cys Ile
 290 295 300

Gly Asp Ala Ile Arg Lys Met Ala Pro Asn Asn Gly Gln Gly Ala Asn
 305 310 315 320

Met Ala Ile Glu Asp Ala Cys Ser Leu Ala Asn Ile Leu Gln Lys Lys
 325 330 335

Ile Ser His Gly Ser Ile Arg Asp Gln Asp Ile Asn Ser Met Phe Gln
 340 345 350

Glu Phe Ser Met Ala Gln Arg Ala Arg Thr Glu Ser Val Cys Ala Gln
 355 360 365

Ser Glu Phe Leu Val Arg Met His Ala Asn Gln Gly Ile Gly Arg Arg
 370 375 380

Leu Leu Gly Arg Tyr Leu Ile Pro Phe Leu Tyr Asp Ala Pro Ala Gly
 385 390 395 400

Leu Ser Gly Phe Ser Ile Ser Gly Ala Thr Arg Ile Glu Phe Ile Asp
 405 410 415

Leu Pro Thr Arg Ser Leu Arg Gly Ala Trp Gly Lys Ser Trp Arg Gly
 420 425 430

Ser Trp Glu Phe Ile Leu Gln Ser Leu Val Tyr Leu Arg Pro Lys Phe
 435 440 445

Arg Ile Val Tyr Ala Leu Tyr Leu Val Ala Ala Ala Ala Phe Ile Leu
 450 455 460

Tyr Cys Leu Ser Ser Leu Phe Pro
 465 470

<210> 5
 <211> 2063
 <212> DNA
 <213> Neotyphodium lolii

<400> 5
 atgcaatacgt gtaatttaac aactgtatta cttctgcgta atactttatt gtccttgaat 60
 tcttcgtcaa tctgccatgt tcaactggctg caagtgattg tggctctgct tgtcttgatc 120
 gtctgcatct ttctatatgt gcgaacaccc actggcatca atgctccttt cgcaggatat 180
 cgttcacccat gggagccgcc gctcttggtt cagatgcgtt acgtcttcaa cgctgcctca 240
 atgatacgcg aaggatatgc taaggatatgt tttatccgcg gtagaggtct tctaccgga 300
 tagaccgaga agataacaac ttcggaacag tggaaagact ccttggtcca gatctcacga 360
 tacgacggtg acattcttat tgtgcctcca agatatttgg atgacctcca caacaagtca 420
 caagaggagt taagtgctat ttatggtttg attcgggtga ggaatgccac caaccaaaaa 480
 acgcagagcc tattagcgca tgggtctcaca tattcgaatt tgctagaatt ttgggtgtag 540
 ctatagcggc atcacctgc ttggagaaaa cgatgttggc attcgtgcgc ttcaggtatg 600
 tacacccttc caaaagtctg ttagggacct tccttactct actacagaca aaaatcaccc 660
 caaatcttgc gaaattatgc gatgacataa gggatgagtt tcagtattgt ctagatacag 720
 acttcccagc ctgcagaggt atgccatttc caaaatccca ttatgcagtc tctacttttt 780
 ctggcactaa cgatatctaa catagattgg acatcagtggt ccgtgcatcc attgtttcta 840
 aaagcagtcg aaaggataac acatcggatt tttgttggat tgccattatg tcggaatccc 900
 caatgggtcc aagcgaccag caagcatgca cattacggta cgtcaattga ctaataatag 960
 gcaatatacg cgctcatatg ctttgcagca acaatgatac agatagctat gagatctgtc 1020
 ccaaagttca ttcagccttt actaaatfff tgccttccgt ggccatggaa gaacgcagcc 1080
 tgtgttcgtg aagcaaagaa tgcccttata ttagaaatgc aacgccgacg aaatctcgag 1140

aaagttaaca gttttgatta tatcaaattcc aatgacttgc tgcaagcagt tatggaaatg 1200
 tcttctccta gtcattgagga tagccagctt gatgttgctg cccagataat gctcacgatg 1260
 aacacaatcg ctggccacag tactgcccga tccggagcac atgcactgtt cgatatgggt 1320
 agccactcta agtatattga attgctgctg gaggaggttc ttcaagtctt tcgacatgtt 1380
 gaactgcgtg ttacaaaaca ggctttgggg gatttgcgaa aattggacag cttcctcaga 1440
 gagttagtat tgtcctaaac atcacaatct caccacattc tcacgctagc ttttcctccg 1500
 tactaatgat ggtcgttgct aagatcccaa cgacataatc cgctaagctt gtgtatgttt 1560
 agctaagagt ctgaaaaacc tggaaatgtt tgtcctgtgc ccgagttcta acgtctctta 1620
 ctacagtagg cttttttcgg gtcgtattag accctgccgg tatcacactt caagatggca 1680
 cacatgttcc ttacaacaca ctgctttgtg tcgcaccaca tgcgatatcc aatgacccgg 1740
 atgtgataga agaccaacc tcgttcaacg gtctgcgata ctacgaacag cgctgtcgtg 1800
 acgccagtca agagaaaaag catcaatacg ctactacgga taaatctcac ctgcattttg 1860
 gctacggaac ctgggcctgt ccaggccgct tcttggcctc tgatatgtta aaagtgattc 1920
 taacgatgct tctgcttcag tatgacatcc gctccccga gagagcaaaa cggcctgtgg 1980
 caggtcattt tcatgagttt ccgcttttca atattaacac accactgtta atgaaacgac 2040
 gcaatgattc gctagttcta tga 2063

<210> 6
 <211> 533
 <212> PRT
 <213> Neotyphodium lolii

<400> 6

Met Gln Tyr Gly Asn Leu Thr Thr Val Leu Leu Leu Arg Asn Thr Leu
 1 5 10 15

Leu Ser Leu Asn Ser Ser Ser Ile Cys His Val His Trp Leu Gln Val
 20 25 30

Ile Val Ala Leu Leu Val Leu Ile Val Cys Ile Phe Leu Tyr Trp Arg
 35 40 45

Thr Pro Thr Gly Ile Asn Ala Pro Phe Ala Gly Tyr Arg Ser Pro Trp
 50 55 60

Glu Pro Pro Leu Leu Val Gln Met Arg Tyr Val Phe Asn Ala Ala Ser
65 70 75 80

Met Ile Arg Glu Gly Tyr Ala Lys Trp Lys Asp Ser Leu Phe Gln Ile
85 90 95

Ser Arg Tyr Asp Gly Asp Ile Leu Ile Val Pro Pro Arg Tyr Leu Asp
100 105 110

Asp Leu His Asn Lys Ser Gln Glu Glu Leu Ser Ala Ile Tyr Gly Leu
115 120 125

Ile Arg Asn Phe Gly Gly Ser Tyr Ser Gly Ile Thr Leu Leu Gly Glu
130 135 140

Asn Asp Val Gly Ile Arg Ala Leu Gln Thr Lys Ile Thr Pro Asn Leu
145 150 155 160

Ala Lys Leu Cys Asp Asp Ile Arg Asp Glu Phe Gln Tyr Cys Leu Asp
165 170 175

Thr Asp Phe Pro Ala Cys Arg Asp Trp Thr Ser Val Ser Val His Pro
180 185 190

Leu Phe Leu Lys Ala Val Glu Arg Ile Thr His Arg Ile Phe Val Gly
195 200 205

Leu Pro Leu Cys Arg Asn Pro Gln Trp Val Gln Ala Thr Ser Lys His
210 215 220

Ala His Tyr Ala Thr Met Ile Gln Ile Ala Met Arg Ser Val Pro Lys
225 230 235 240

Phe Ile Gln Pro Leu Leu Asn Phe Cys Leu Pro Trp Pro Trp Lys Asn
245 250 255

Ala Ala Cys Val Arg Glu Ala Lys Asn Ala Leu Ile Leu Glu Met Gln
260 265 270

Arg Arg Arg Asn Leu Glu Lys Val Asn Ser Phe Asp Tyr Ile Lys Ser
275 280 285

Asn Asp Leu Leu Gln Ala Val Met Glu Met Ser Ser Pro Ser His Glu

290

295

300

Asp Ser Gln Leu Asp Val Val Ala Gln Ile Met Leu Thr Met Asn Thr
305 310 315 320

Ile Ala Gly His Ser Thr Ala Ala Ser Gly Ala His Ala Leu Phe Asp
325 330 335

Met Val Ser His Ser Lys Tyr Ile Glu Leu Leu Arg Glu Glu Ala Leu
340 345 350

Gln Val Phe Arg His Val Glu Leu Arg Val Thr Lys Gln Ala Leu Gly
355 360 365

Asp Leu Arg Lys Leu Asp Ser Phe Leu Arg Glu Ser Gln Arg His Asn
370 375 380

Pro Leu Ser Leu Leu Gly Phe Phe Arg Val Val Leu Asp Pro Ala Gly
385 390 395 400

Ile Thr Leu Gln Asp Gly Thr His Val Pro Tyr Asn Thr Leu Leu Cys
405 410 415

Val Ala Pro His Ala Ile Ser Asn Asp Pro Asp Val Ile Glu Asp Pro
420 425 430

Thr Ser Phe Asn Gly Leu Arg Tyr Tyr Glu Gln Arg Cys Arg Asp Ala
435 440 445

Ser Gln Glu Lys Lys His Gln Tyr Ala Thr Thr Asp Lys S